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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/756,401	01/14/2004	Motonao Nakao	HIRA.0134	3504
7590	04/18/2006		EXAMINER	
Reed Smith LLP Suite 1400 3110 Fairview Park Drive Falls Church, VA 22042-4503			JUNG, UNSU	
			ART UNIT	PAPER NUMBER
			1641	
DATE MAILED: 04/18/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/756,401	Applicant(s) NAKAO, MOTONAO	
	Examiner Unsu Jung	Art Unit 1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 February 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 1-5 and 7-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>9/8/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-16 are pending.

Election/Restrictions

2. Applicant's election without traverse of Group II (claim 6) in the reply filed on February 21, 2006 is acknowledged.

Information Disclosure Statement

3. The information disclosure statement (IDS) submitted on September 8, 2004 has been considered by the examiner. However, the IDS submitted on September 8, 2004 contains an error in ending page number for Radtchenko et al. reference. The ending page number should be corrected to "1687."

Specification

4. The disclosure is objected to because of the following informalities: it is not clear as to what the phrase "reflected light or confusion (scattered?) light" on p7, line 18 means. Further clarification is required for the phrase "reflected light or confusion (scattered?) light."

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. In claim 6, the term "functional beads" in lines 2 and 4-6 is vague and indefinite. It is unclear whether or not the term "functional beads" in lines 2 and 4-6 is referring to "beads" in line 1.

8. Claim 6 recites the limitation "the surface" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable Ho (U.S. PG Pub. No. US 2002/0164271, Nov. 7, 2002) in view of Kulmala et al. (U.S. PG Pub. No. 2002/0081749, June 27, 2002).

Ho teaches a multiplexing approach to optically bar code microspheres with the incorporation of semiconductor nanocrystals (nanoparticles) such as quantum dots (p1, paragraphs [0009] and [0010]). Quantum dot luminescent materials emit a range of different colored lights (wavelengths) when exposed to light 20 times brighter and 100 times more stable and 3 times narrower in spectral linewidth compared to organic fluorescent dyes (p1, paragraph [0003]). Using size dependent nanocrystals, a very large number of optical codes can be fabricated after multiplexing both wavelength and intensity (p1, paragraph [0011]). Ho teaches a method for reading beads, the method comprising the steps of:

- introducing functional beads having a coating layer on the surface (Fig. 1) thereof and having nanoparticles such as quantum dots present in the coating

layer (p2, paragraph [0017]) to a flow path (Fig. 4 and pp2-3, paragraph [0039]);

- enabling the functional beads in the flow path to emit light with a wavelength specific to the nanoparticles (pp2-3, paragraph [0039]); and
- identifying the functional beads based on the emission (p3, claim 8).

However, Ho fails to teach a method of enabling functional beads to emit light with a wavelength specific to nanoparticles by applying a voltage to the functional beads.

Kulmala et al. teaches that use of active metal electrodes or semiconductor electrodes makes it possible to simultaneously excite a variety of different luminescent labeling substances in fully aqueous solution (p1, paragraph [0006]). Presently, there is an increasing need for multiparameter assays due to a growing demand to decrease the costs and/or increase the simplicity and accuracy of determinations (p1, paragraph [0002]). One solution to these problems is the use of label compounds luminescing at different wavelengths (p1, paragraph [0002]). The method and apparatus of Kulmala et al. can be used with one or several types of label substances, which can be simultaneously electrically excited by applying a voltage (p4, paragraph [0036]), so that the resulting luminescence can be utilized in bioaffinity assays such as immunoassays and DNA or RNA probing assays (p1, paragraph [0007]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use metal electrodes or semiconductor electrodes to apply voltage as an enabling means as taught by Kulmala et al. in order to excite luminescent labels (nanocrystals/nanoparticles) present in the functional beads of Ho for use in

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multiplexing approach for optical bar coding since the method of using active metal electrodes or semiconductor electrodes makes it possible to simultaneously excite a variety of different luminescent labeling substances in fully aqueous solution. In multiplex biological assays, one of ordinary skill in the art would readily recognize that the ability to simultaneously excite a variety of different luminescent labeling substances is advantageous over the enabling means of Ho as more simple and less expensive method of Kulmala et al. (p4, paragraph [0037]) is capable of exciting a variety of different luminescent labeling substances using one electrical excitation source compared to the method of using a light source with a specific wavelength for excitation of different luminescent labeling substances as in the case of Ho (pp2-3, paragraph [0039]), which requires different excitation light sources for different luminescent labeling substances.

Conclusion

12. No claim is allowed.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Unsu Jung whose telephone number is 571-272-8506. The examiner can normally be reached on M-F: 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on 571-272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Unsu Jung, Ph.D.
Patent Examiner
Art Unit 1641



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04/10/06